Machine Vision & Auto ID

Track, Trace & Control Solutions

MICROSCAN®

Precision Data Acquisition and Control Solutions

Microscan is a global technology leader focused on precision data acquisition and control solutions serving a wide range of automation and OEM markets.

Data Acquisition and Control Solutions

We help manufacturers around the world drive down cost and waste, automate critical manufacturing processes, and increase yields though data acquisition and control solutions.

From personal electronics to clinical instruments and automotive components, Microscan solutions enable critical production level applications such as quality control, work-in-process monitoring, guiding the movement of goods, component traceability, sortation, and lot tracking.

Precision

Microscan products are precision instruments. From tasks such as high speed barcode reading to high accuracy orientation, placement and coordinate checking through machine vision, Microscan products reliably perform complex data acquisition.

Technology Leader

Microscan has a strong history of technology innovation. We revolutionized the automatic identification (auto ID) industry in the early 1980s with the invention of the first laser-diode barcode scanner, and with the invention of the 2D symbology, Data Matrix. We pioneered the machine vision industry with our advanced vision and lighting products.

Today, Microscan continues to be a recognized technology leader through continuous new product development in the areas of machine vision and auto ID.

Three Reasons Microscan is a Global Technology Leader

(1) Our company was founded on technology innovation

- Inventor of the laser-diode barcode scanner
- Inventor of the 2D Data Matrix symbology
- Over 25 years of innovation in auto ID and machine vision

(2) We continue technology leadership

- Long list of "firsts" for auto ID and machine vision
- Others follow Microscan's new technology and product development

(3) We have unique patented technology solutions

- Hold over 90 technology patents in the U.S.
- More than 30 technology patents pending
- Extensive library of powerful machine vision algorithms and tools

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Quality Focus

An ISO 9001 certified company since 1996, with national recognition for Quality Leadership, Microscan is proud of our quality record.

"We guarantee quality by maintaining established standards, encouraging innovation, and inspiring our employees to excellence. We are committed to the continual improvement of processes, products and services, and to the delivery of solutions that exceed customer expectations."

—Microscan Quality Policy

European Headquarters

Corporate Headquarters

Technology Center

MICROSCAN®

Global Strength

Microscan is a preferred supplier to companies around the world. With multi-language websites and worldwide office locations, we offer comprehensive service and support, including online and technical support, field services, and multilingual documentation.

Microscan products are represented and supported through a global network of partners and systems integration companies who specialize in automation solutions. The network includes more than 300 top automation integrators and value added resellers in over 30 industrialized countries, with technology specialization in specific sub-channels and complementary product lines.

Worldwide Microscan office locations:

- U.S. (Corporate Headquarters, Technology Center & Regional)
- Europe (Netherlands, Germany, Belgium, Turkey)
- China (Shanghai, Guangzhou, Beijing)
- Singapore
- South Korea
- Japan
- Mexico

Asia Pacific Headquarters

Contents Guide

DATA ACQUISITION TECHNOLOGY

Auto ID and Symbologies

Linear or 1D barcodes have been in commercial use since the 1970s and are the most common symbology type used for automatic identification part tracking. Today, increasing numbers of manufacturers are using two-dimensional (2D) symbols, such as Data Matrix, that offer greater placement flexibility and increased data capacity. Many industries specify the exact symbologies which must be used, and regulate their quality.

In addition, many manufacturers now practice "cradle-to-grave" traceability and permanently mark parts with a machine-readable symbol that is verified at each stage of the manufacturing process. Machine-readable symbols generally fall into the categories of linear barcodes, stacked symbols, 2D symbols, and Optical Character Recognition (OCR) fonts. A few examples of each are shown below.

Microscan provides fast, reliable reading solutions for all symbologies and OCR. Our products read any linear barcodes or 2D symbols printed or marked by any means.

1D and 2D Symbology Standards

- Automotive Industry Action Group: AIAG B4
  Parts Identification and Tracking
- U.S. Department of Defense: IUID MIL STD 130
  Permanent & Unique Item Identification
- Electronics Industry Association: EIA 706
  Component Marking
- ISO/IEC 16022
  International Symbology Specification
- ISO/IEC 15418
  Symbol Data Format Semantics
- ISO/IEC 15434
  Symbol Data Format Syntax
- ISO/IEC 15415
  2D Print Quality Standard
- Society of Aerospace Engineers: AS9132
  Data Matrix Quality Requirements For Part Marking
- AIM DPM
  Direct Part Mark Quality Guideline
  (See following page for details)

Linear Barcodes

Code 128
Code 39
Pharmacode
Code 93
I2 of 5
UPC

Stacked Symbologies

PDF417
GS1 Databar (Stacked)
Micro PDF
GS1 Databar (Composite)

OCR Fonts

OCR-A	OCR-B	MICR E-13B	SEMI M12
1234ABCD	1234ABCD	1234	1234ABCD
Alphanumeric (+4 currency char.)	Alphanumeric (+4 currency char.)	Numeric (+4 special char.)	Alphanumeric (+4 currency char.)

2D Symbologies

Data Matrix
QR
Aztec

Data Matrix Size/Data Comparison Chart

Symbol Size Row x Column	Data Capacity Numeric	Alphanumeric	5 mil Examples	7.5 mil Examples	10 mil Examples	15 mil Examples
10 x 10	6	3	1.27 mm	1.90 mm	2.54 mm	3.81 mm
12 x 12	10	6	1.52 mm	2.29 mm	3.05 mm	4.57 mm

DATA ACQUISITION TECHNOLOGY

Direct Part Marking and Verification

Automated tracking of products down to the individual part and component level has proven to have great bottom-line impact. The most direct way to ensure complete quality control of the production process is to directly mark objects with permanent machine-readable symbols for tracking through their entire life cycle.

There are many methods to directly mark objects. Direct part marks (DPM) are typically 2D symbols permanently marked by methods such as dot peen or laser/chemical etch onto substrates including metal, plastic, rubber or glass. These marking methods often result in low contrast visibility of the symbol or inconsistent imprints that can be challenging to decode through traditional imaging technology. Many industries have strict symbol verification requirements and standards to ensure traceability of parts and components. Verification of symbol quality ensures that it can be decoded throughout a supply chain and throughout a marked product's life cycle.

Microscan offers a comprehensive family of readers and verifiers with illumination and decode algorithms specifically designed for any challenging direct part marks.

AIM DPM:
Direct Part Mark Quality Guideline

The AIM DPM Quality Guideline was developed to assess the symbol quality of direct part marks. It defines modifications to the measurement and grading of eight different symbol quality parameters, including:

- AXIAL NON-UNIFORMITY
- GRID NON-UNIFORMITY
- CELL CONTRAST
- CELL MODULATION
- FIXED PATTERN DAMAGE
- PIXELS PER ELEMENT
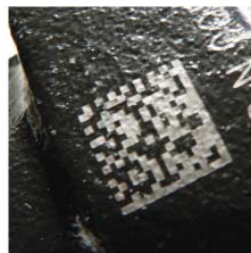- PRINT GROWTH
- UNUSED ERROR CORRECTION
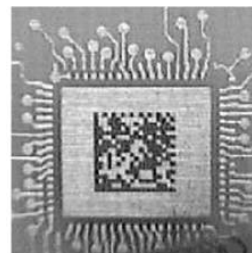
Examples of Direct Part Marks
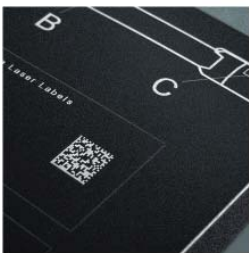
Laser etch on glass

Ink jet on plastic

Laser etch on metal

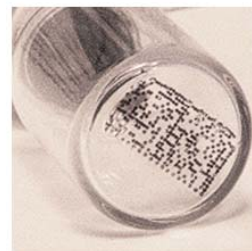
Laser etch on metal

Ink jet on ABS plastic

Thermal print on foil

Dot peen on machined metal

Dot peen on textured metal

Ink jet on glass

**Chem etch on plastic**

DATA ACQUISITION TECHNOLOGY

Machine Vision Image Capture and Analysis

100% quality control in manufacturing reduces costs and ensures a high level of customer satisfaction. With its enormous potential and capabilities, machine vision is becoming the standard discipline for automating inspection and other modern industrial problems, through complex image capture and analysis. While human inspectors working on assembly lines can visually inspect parts to judge the quality of workmanship, machine vision systems use a variety of advanced hardware and software components to perform similar tasks at high speeds with greater precision.

Microscan holds one of the world's most robust patent portfolios for machine vision technology, including hardware design, software algorithms and machine vision illumination. Our Visionscape® brand of machine vision hardware and software is an industry pioneer, improving automated technical identification, inspection, measurement, and guidance capability to the benefit of manufacturers worldwide.

Machine Vision Capabilities

- **Identify**
  - Decode all standard 1D and 2D symbols
  - Optical Character Recognition (OCR) and Verification (OCV)

- **Inspect**
  - Color or flaw detection
  - Absence/presence of parts or components
  - Object location and orientation

- **Measure & Gauge**
  - Measure dimensions or fill levels
  - Preconfigured measurements such as line intersection or point-to-point distance

- **Robotic Guidance**
  - Output coordinates to guide machines or tools to precise locations
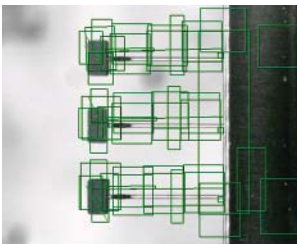
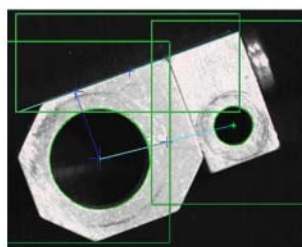**Complex, high speed inspection**
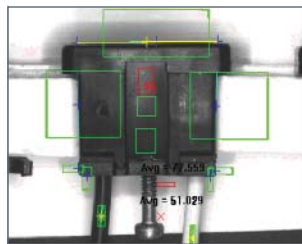
Check for completeness
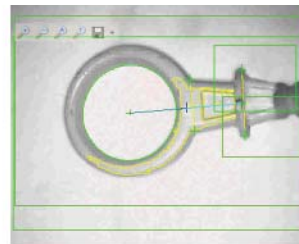
Shape inspection

Pattern comparison
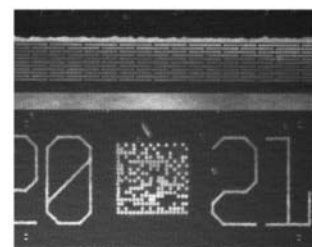

Measurement

Position/angle detection

OCR reading

1D/2D symbol reading

Track, Trace, & Control

Many industries – from automotive and electronics assembly to drug discovery and pharmaceutical packaging – depend on reliable automatic identification and machine vision to manufacture products. Few products can be produced without some form of auto ID or machine vision. The increasing need for higher production output at a lower cost places more stringent demands on manufacturing systems.

At Microscan, we help thousands of manufacturers around to world to drive down cost and waste, automate critical manufacturing processes, and increase yields. Microscan's precision data acquisition products and solutions will enable you to meet your track, trace, and control objectives.

Industries Served:
- Electronics manufacturing
- Semiconductor manufacturing
- Aerospace manufacturing
- Clinical diagnostics
- Food and beverage packaging
- Contract manufacturing
- Dept. of Defense supply chain
- Document handling
- Automotive manufacturing
- Pharmaceutical packaging
- Drug discovery
- Kiosks
- And many more!

Enhanced Productivity Through Data

TRACE: Where has it been? TRACK: Where is it now? CONTROL: Where is it going?
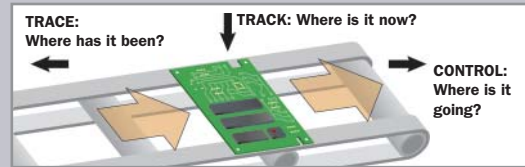
- **TRACK (Present)**
  Auto ID and machine vision are used to track parts that are work-in-process, or "WIP". Tracking specific parts and their locations provides critical data that plant floor managers use to maximize yield based on available capacity.

- **TRACE (Past)**
  Traceability is the ability to recreate or "trace" the manufacturing steps, processes, or location of a part during its assembly. Item level traceability is critical because it allows for quick containment of parts that may have undergone suspect or incorrect manufacturing processes.
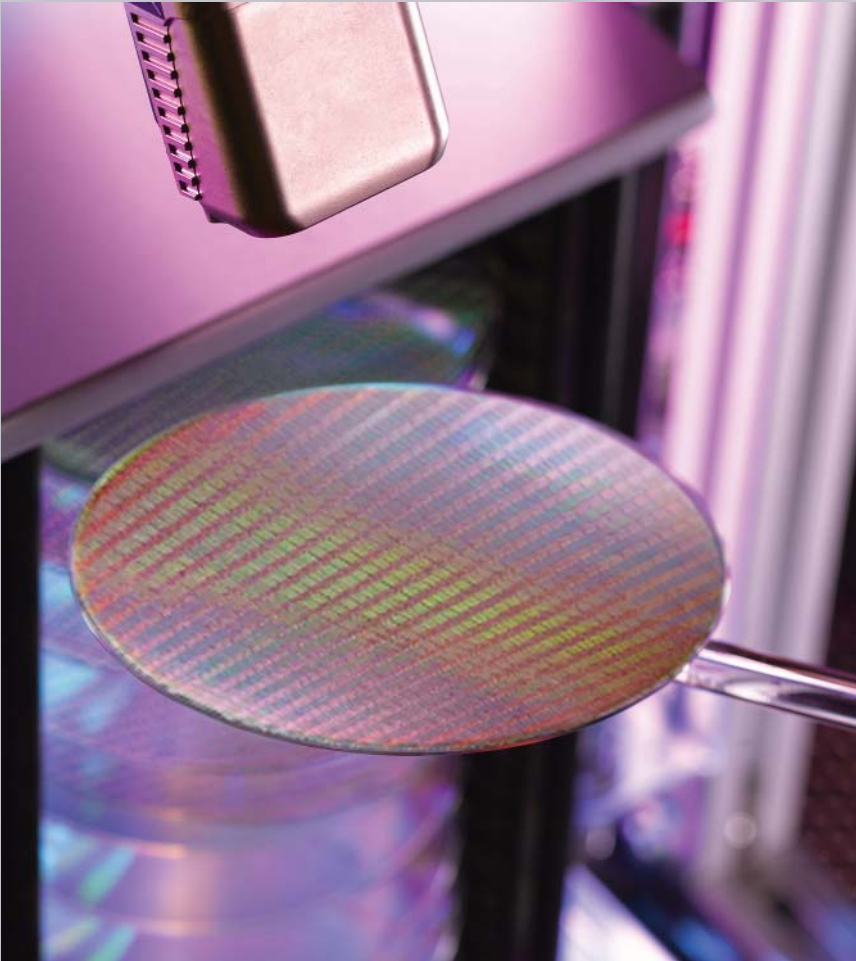
- **CONTROL (Future)**
  Control is used to decide what step or future process a part must undergo. Machine vision inspection is a key element in many quality control processes and ensures that parts that do not meet exacting standard are rejected before moving further into the supply chain.

INDUSTRY SOLUTIONS

Focus on Electronics

Industry leaders within electronics and semiconductor manufacturing need to enable lean manufacturing, assure quality, and optimize efficient use of resources.

Microscan products help these companies to maximize quality, productivity, and efficiency through diverse applications such as:

Auto ID Tracking & Traceability

- Printed circuit board traceability
- Sub-assembly tracking
- Traceability through SMT processes
- Quality assurance
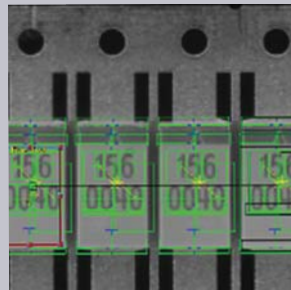- Semiconductor wafer tracking

Machine Vision

- Wafer positioning
- Location & alignment for pick and place
- Color matching
- Ball grid array inspection
- Die attach bond inspection
- Absence/presence of parts
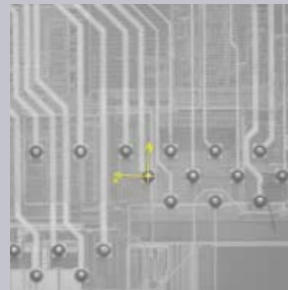- Robotic guidance

Application Examples
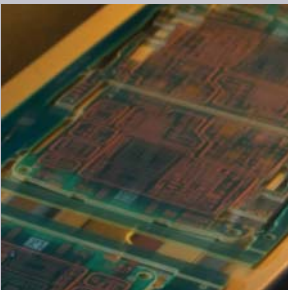
- Reading and verification of marked Data Matrix

- High speed, multi-camera inspection of defects

- High precision part location

- Reading Data Matrix and Optical Character Recognition (OCR)

Industry solutions

Focus on Life Sciences

Data accuracy and reliability are critical within life sciences industries where manufacturers need to increase throughput while meeting regulatory compliance.

Microscan helps manufacturers throughout clinical diagnostics, drug discovery, medical devices, and pharmaceutical industries in diverse applications such as:

Auto ID Tracking & Traceability

- Sample tracking
- Medical device tracking
- Test level traceability
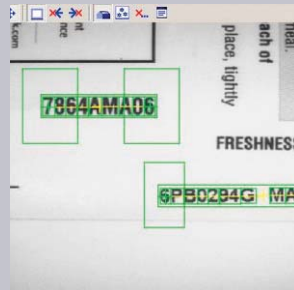- Vial reading verification

Machine Vision

- Date and lot verification
- Color detection
- Robotic guidance
- Test tube cap and color inspection
- Inspect package integrity
- Dimensional gauging
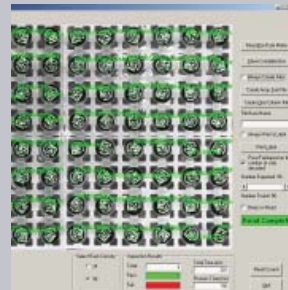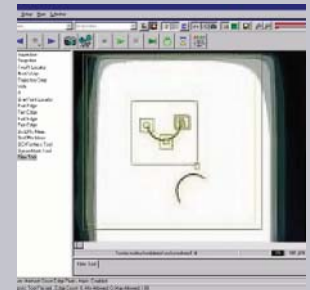- Measure fill levels and sealings

Application Examples

- High speed reading of long linear barcodes
- Advanced Optical Character Recognition (OCR) and Verification (OCV) capabilities
- Reading 96 Data Matrix in a single capture
- Detailed inspection of small parts and components

Industry solutions

Focus on Automotive

Automotive suppliers and OEMs today rely on data tracking for quality assurance, spill prevention, error proofing, reduction of costly reworks, and increasing production yields.

Microscan helps these companies assure quality and increase productivity through diverse applications such as:

Auto ID Tracking & Traceability

- Parts traceability
- WIP tracking
- Spill prevention and containment
- Build-sheet reading
- Mark verification

Machine Vision

- Assembly verification
- Error proofing
- Sorting parts
- Dimensional gauging
- Quality assurance
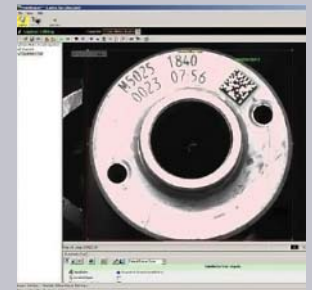- Robotic guidance

Application Examples

- Reading and verification of direct part marks
- WIP verification
- Dimensional check inspection
- Inspection of parts and components

Product Portfolio

We help manufacturers around the world drive down cost and waste, automate critical manufacturing processes, and increase yields though data acquisition and control solutions. From tasks such as high speed barcode reading to high accuracy orientation, placement and coordinate checking through machine vision, Microscan products reliably perform complex data acquisition.

Our brands such as Visionscape®, NERLITE®, Quadrus® and Hawk™ are globally recognized for quality and precision. Microscan's product families offer comprehensive solutions for any data acquisition need.
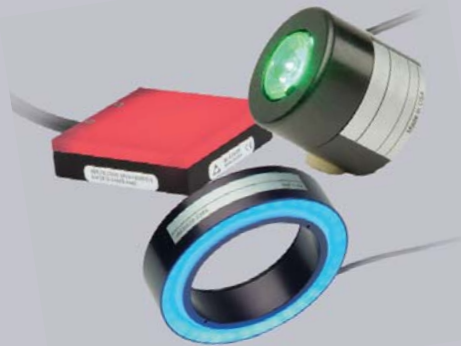
Machine Vision
Identify, Inspect, Measure, Guide

Machine Vision Lighting
Enabling Readability

Auto ID
Barcode Traceability & Verification

Solutions
Software, Engineered & Special Industry Focus

Product Portfolio

Machine Vision Systems

Microscan holds one of the world's most robust patent portfolios for machine vision systems technology, including hardware design and software algorithms. With the feature-rich Visionscape® software platform, our comprehensive line of machine vision products provide a broad range of vision capabilities.
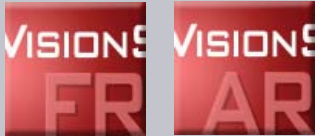
Visionscape software provides all the elements required to develop and deploy industrial machine vision applications, in a configuration environment that can be tailored to different users for maximum productivity. An extensive collection of proven image processing tools and a powerful graphical user interface (GUI) enable the simple and quick implementation of machine vision applications in any industry. Refer to page 6 for detailed information on Visionscape software capabilities.

■ **FrontRunner Interface**
"Engineering" GUI provides application evaluation, development, training, parameter change and monitoring.

■ **AppRunner Interface**
"Monitoring" GUI displays run time, application monitoring and results.

■ **Intellifind**
Geometric pattern match tool for robust pattern location and pattern recognition in noisy images; includes scale measurement.

■ **ActiveX Library**
Complete set of ActiveX components allow the creation of custom user interfaces and creation of vision applications on the fly.

■ **Visionscape® Smart Camera**
Series of smart cameras with broad applicability, versatility, and proven performance of Visionscape software.

HE1600TIS: With Intellifind

HE1600TS: Without Intellifind

HE1600TIH: High resolution, with Intellifind

HE1600TH: High resolution, without Intellifind

■ **Visionscape® GigE Solution**
Gigabit Ethernet software and compact cameras allow rapid deployment of any scale of machine vision solution.

VGA MONO CMOS (Color Optional)

VGA MONO CCD (Color Optional)

VGA MONO CCD POE (Power Over Ethernet)

XGA MONO CCD

SXGA MONO CCD (1.3 Megapixel)

UXGA MONO CCD (2 Megapixel)

QSXGA MONO CCD (5 Megapixel)

■ **Visionscape® Frame Grabbers**
Capture images from a variety of machine vision cameras into the host PC memory.

0740: Supports up to four progressive scan cameras

**0800:** Supports one digital CameraLink camera

Product Portfolio

Machine Vision Lighting

Microscan's wide range of advanced NERLITE® lighting solutions feature sophisticated optical technology and user-friendly designs. These precision illumination products allow machine vision and auto ID systems to perform reliably in any imaging application.

	LIGHT IN USE	OBJECT	RESULTING IMAGE

■ **NERLITE Array**
Spot, Area and LALL™ (Large Area LED Light) for illuminating small to very large areas or when very high intensity is required. Suitable for indoor or outdoor use.
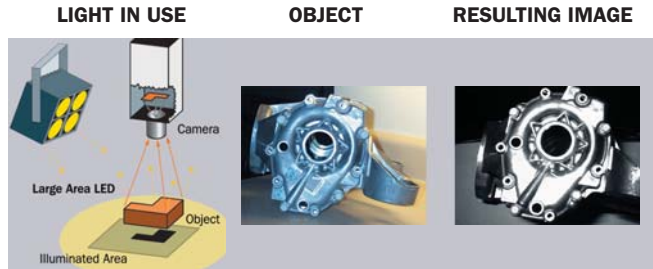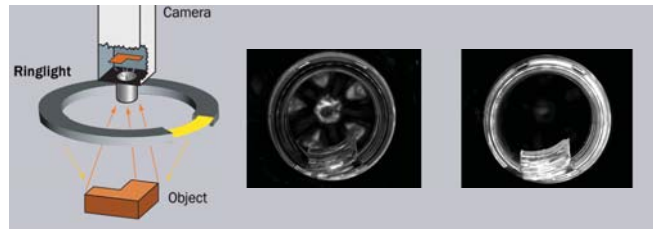
■ **NERLITE DOAL® & SCDI®**
Provides diffuse, uniform illumination. DOAL modules offer collimated illumination for flat, specular surfaces and SCDI is ideal for moderately faceted and undulating surfaces.
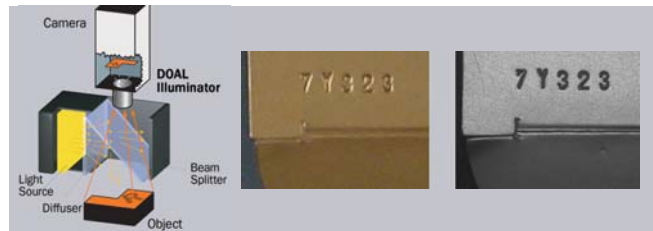
■ **NERLITE Ring Light**
Economical and practical choice for illuminating diffused or specular surfaces.
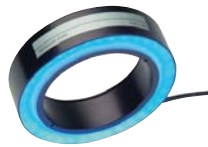
■ **NERLITE Backlight**
Provides sharp contrast to outline a part's shape, hide clear housings, and view openings such as drilled holes.

■ **NERLITE Dark Field Illuminator**
Provides low-angle illumination to enhance the contrast of surface features such as laser embossed or engraved marks and surface defects.

■ **NERLITE CDI®**
Patented optics and precision integrated sphere technology yield a self-contained continuous diffuse light unrivaled in this industry.

View full product line and specifications at www.microscan.com.

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Product Portfolio

Auto ID Barcode Readers

From small products for embedded OEM applications to rugged readers for industrial manufacturing environments, Microscan offers a wide range of quality products to read linear barcodes and stacked symbols, with features such as high speed reading, wide field of view, symbol reconstruction, and aggressive decoding technology.

Embedded Reader Series

■ **MS-1**
Smallest fully decoded scan engine in its class.

■ **MS-2**
Compact CCD reader is available in several configurations to meet a variety of applications.

■ **MS-3**
Compact laser scanner offers high performance decoding and wide scan angle.

■ **MS-9**
Laser scanner offers ultra-fast decode performance.

Industrial Scanner Series

■ **QX-830**
Compact laser scanner features QX Platform, symbol reconstruction, and optional embedded Ethernet protocols.

■ **QX-870**
Sweeping raster laser scanner with QX Platform, symbol reconstruction, and optional embedded Ethernet protocols.

■ **MS-890**
Heavy duty laser scanner with extended read range, auto focus, and sweeping raster.

QX Platform provides high performance connectivity, networking and decoding in any automated industrial environment.

Quick Connect: Includes M12 Ultra-Lock™ connectors and cordsets for plug and play setup of single or multi-reader solutions.

X-Mode: Provides superior ease of use and our most advanced symbol decoding technology, such as symbol reconstruction or reading direct part marks.

Product Portfolio

Auto ID 2D Fixed-Mount Readers

Our 2D fixed-mount readers feature the latest technology for decoding both 2D symbols and linear barcodes. Specialty readers are available for high speed reading, ESD-sensitive applications, and decoding the most challenging direct part marks (DPM).

Compact Reader Series

■ **MS-4**
Ideal imager for OEM design engineers who need to read 1D and 2D symbols in tight spaces.

■ **Quadrus® MINI**
Miniature imager series with wide field of view and real time autofocus. ESD-safe and three megapixel configurations are available.

■ **Quadrus® MINI Velocity**
High speed miniature imager with dynamic autofocus.

■ **MINI Hawk**
Miniature imager with X-Mode featuring easy plug and play setup and reliable decoding of challenging direct part marks. High speed and high resolution configurations are available.

High Performance Reader Series

■ **HawkEye® 1500**
Flexible and powerful series of DPM readers with optional built-in verification and C-mount lens.

■ **QX Hawk**
Fully integrated liquid lens imager provides infinite focus capabilities. Exceptionally easy to use, with embedded Ethernet and IP65/67 rating.

Integrated Liquid Lens System

World's first fully integrated liquid lens imaging system is deeply embedded within the QX Hawk to optimize the entire imaging system and provide a 1" to infinity working range.

Electrostatic pressure creates currents that react quickly with the two liquids to produce the appropriate lens curvature.

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View full product line and specifications at www.microscan.com.

Product Portfolio

Auto ID 2D Handhelds and Verifiers

Our auto ID products include verifiers and handheld 2D readers featuring the latest technology for decoding symbols and verifying their quality. Handheld readers are ideal for any track, trace, or control application. Symbol verification ensures only the highest quality marks enter the supply chain, to help guarantee successful traceability implementation.

Handheld Reader Series

■ **HS-1**
Economical linear barcode reader.

■ **HS-2D**
Economical imager for reading both 1D and 2D high contrast symbols.

■ **MS-Q Quadrus®**
Decoding capabilities include high density linear and 2D symbols, as well as simple direct part parts.

■ **HawkEye® 45T**
Includes an integrated screen to display decode data and allow easy configuration.

■ **Mobile Hawk**
Robust DPM imager reads any symbol with a simple trigger pull. Includes aggressive decoding and advanced lighting for reading the most challenging direct part marks.

Verifier Series

■ **DPM Verifier**
UID Compliance Verifier designed for verifying direct part marks.

■ **LDP Verifier**
UID Compliance Verifier designed specifically for labels and data plates.

Product Portfolio

Communication and Connectivity for Machine Vision and Auto ID

Microscan's wide range of communication and connectivity products feature high quality components and user-friendly design to supplement our auto ID, lighting, and machine vision systems, and enable quick and easy installation and networking.

Machine Vision

■ **Cameras**
Analog VGA and SXGA cameras are available and support C-mount lenses.

■ **Lenses**
Standard C-mount lenses, filters, and spacers are available for use with either an external camera or with the HawkEye 1510 and Visionscape smart camera.

■ **I/O Modules**
Enable the use of discrete inputs and/or outputs with a PC that has Visionscape boards installed.

■ **Cables and Mounting**
Complete selection of cables, mounting hardware, power supplies, calibration targets, and other accessories are available for vision applications.

Machine Vision Lighting

■ **Power Supplies**
DIN rail mount power supplies are compatible with the complete NERLITE product family.

■ **Lighting Controllers**
Includes the power regulation, intensity control, and timing and triggering functions required in machine vision applications.

Auto ID

■ **QX-1**
Complements and streamlines installation of QX Platform products. Features Quick Connect system with M12 Ultra-Lock connectors and IP65 sealing.

■ **Connectivity**
Efficient connectivity and communi-cation tools are available for use within any auto ID application.

■ **Interface Devices**
Interface devices simplify connecting to readers by providing separate ports for the host, power supply, trigger, and network.

■ **Cables and Mounting**
Variety of cables, mounting hardware, power supplies, and other accessories are available.

View full product line and specifications at www.microscan.com.

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Product Portfolio

Industry Focus Solutions

Many industries face unique track, trace, and control challenges, or have specific application parameters which must be met. Microscan has expertly designed and engineered auto ID and machine vision solutions for a variety of industry needs. Some examples are listed below.
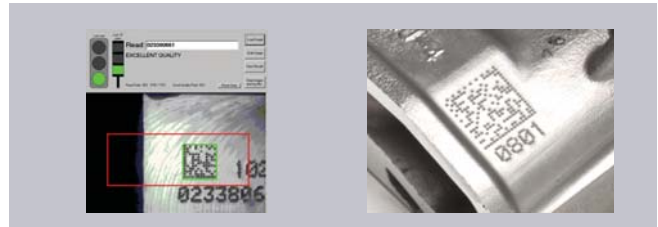
■ **Direct Part Mark Reading Solutions**
Hawk imagers are optimized to read challenging directly marked Data Matrix symbols on metal, glass, rubber, plastic, and other materials.
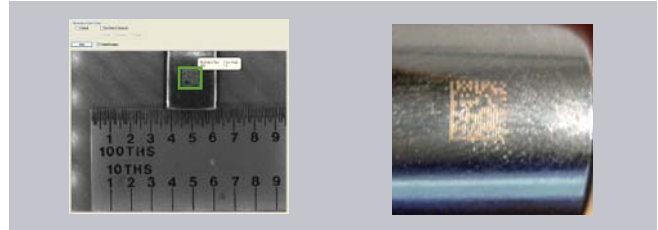
■ **DoD UID Solutions**
Allow compliance with the U.S. Dept. of Defense (DoD) mandated Unique Identification (UID) policy in accordance with MIL-STD-130 and DFAR 252.211-7003.
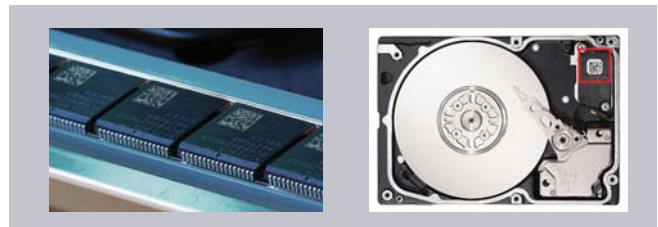

■ **EZ Match Color**
Ultra-compact reader provides clinical life sciences applications with test tube cap inspection and color detection.

■ **Quadrus® MINI ESD Safe**
ESD-safe miniature imager designed for use in the assembly and manufacture of sensitive electronic components.

■ **MS-96 Vial Reader**
High speed system specifically designed to decode Data Matrix symbols on 24 or 96 vials.

■ **Visionscape® I-PAK®**
Proven choice for packaging applications requiring inspection, date and lot tracking, symbol verification, and more. I-PAK is 21 CFR Part 11 compliant.

View full product line and specifications at www.microscan.com.

Product Portfolio

Software and Engineered Solutions

Our advanced software products address a range of modern manufacturing problems and concerns, such as streamlined installation and factory-wide WIP visibility. And for specific data acquisition needs that our general product line does not address, contact us about custom engineered solution development.
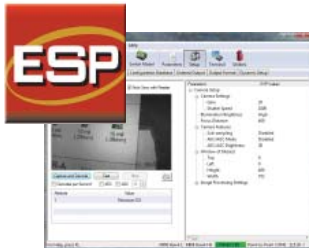
Software

■ **Track, Trace & Control Software**
Track, Trace and Control software enables Lean Material Control for discrete manufacturing by ensuring the right material is at the right place at the right time. From "dock-to-ship", our traceability software solutions support customer Track, Trace & Control requirements and compliance in virtually any assembly process, machine or workstation type.

■ **Visionscape® Machine Vision Software**
Microscan's Visionscape software provides a common environment for fast application development and deployment for all Visionscape products, such as gigE cameras and smart cameras.


■ **ESP® Auto ID Software**
Easy Setup Program (ESP) is a powerful software application that provides quick and easy setup of our complete line of Auto ID scanners and imagers. Offers basic and advanced features with a variety of options for different applications.

Engineered Solutions

Microscan designs and develops high quality specialized engineered solutions to meet specific customer needs. Our Machine Vision and Auto ID experts can pair our products with customized firmware, electronics, optics, or mechanics to create an optimized system to meet the most complex applications and critical customer needs.

Do you have unique track, trace, and control requirements?
Contact us about a custom engineered solution.
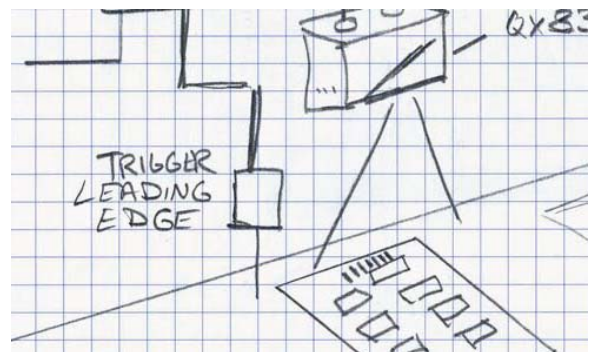
Microscan is a global technology leader focused on precision data acquisition and control solutions serving a wide range of automation and OEM markets. Visit **www.microscan.com** for complete information on Microscan products, technology, specifications, case studies and more.

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